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(56) Documents cited
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(54) **Improvements in or Relating to**
Variable-area Fluid Flowmeters

(57) The use of a conductive coating
on the interior surface of the tube of a
variable-area fluid flowmeter, in order

to prevent sticking of the float to the
tube wall as a result of static electrical
charges, has been found to result in
corrosion of the float, and this is
prevented by employing a float made
of titanium metal.

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SPECIFICATION
Improvements In or Relating to Variable-area
Fluid Flowmeters

This invention relates to variable-area fluid flowmeters of the kind comprising an internally tapered tube and a float contained within the tube and free to move therealong. In use the tube is mounted vertically with the wider end uppermost. The fluid is caused to flow upwardly through the tube and, by reason of the internal tapering of the tube, the float rises within the tube until it reaches an equilibrium position which position provides an indication of the rate of flow of the fluid.

The tube of such a flowmeter is typically made of an electrically insulating material and it is possible in such a case for an appreciable electrostatic charge to appear on the internal surface of the tube. This can arise, for example, if the flowmeter is shaken or temporarily disturbed from its vertical position so that the float rubs against the tube. In the presence of such an electrostatic charge the float may be attracted into contact with the tube, and will thus be prevented from responding to changes in the rate of flow of the fluid. The effect is particularly noticeable when the fluid in question is a dry gas.

To overcome this problem, it has been proposed, in British Patent Specification No. 1,329,903, to employ a tube whose internal surfaces are provided with a material of high electric conductivity that can be connected to ground.

According to another proposal, in British Patent Specification No. 1,511,369, both the internal and the external surfaces of the tube are coated with an electrically conductive substance and there is no provision for electrically connecting either coating to ground.

We have now found that an electrically conductive coating can unfortunately cause corrosion of the float when made of metals such as aluminium alloys. This adversely affects the accuracy of the instrument. We have also found that a float made of a plastics material, while not

corroded in this way, suffers from a recurrence of the electrostatic sticking problem.

According to the present invention, there is provided a variable area fluid flowmeter of the kind specified, in which the tube is made of an electrically conductive material or has on its internal surface a coating of a material of high electrical conductivity compared with the material of the tube, and the float is made of titanium metal.

The float is preferably made by milling, turning or similar techniques from a solid titanium bar. Alternatively, it can be fabricated from sheet titanium or by sintering titanium metal powder in an appropriately shaped mould.

The tube can be as described in either of the patent specifications referred to above. Thus, where the tube is of glass, it can conveniently have a conductive coating of tin oxide as described in either of British Patent Specifications 1,329,903 and 1,511,369. However, it has been found that an electrical connection to ground is unnecessary even where there is a conductive coating on the interior surface only of the tube. In fact this is, for simplicity, a preferred form of flowmeter.

Claims

1. A variable-area flowmeter of the kind specified, in which the tube is made of an electrically conductive material or has on its internal surface a coating of a material of high electrical conductivity compared with the material of the tube and the float is made of titanium metal.

2. A flowmeter according to Claim 1, in which the tube has a coating of electrically conductive material on its internal surface only and there is no provision for electrically connecting the coating to ground.

3. A flowmeter according to either Claim 1 or Claim 2, in which the float is made from a solid bar of titanium metal.

4. A float made of titanium metal for a variable-area flowmeter of the kind specified.